NORTH PACIFIC OCEAN

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The average atmospheric pressure over the North Pacific Ocean during December, 1928, showed pronounced abnormalities. In the central region of the Aleutian cyclone, so far as indicated by the observations at Kodiak (29.29 inches) and Dutch Harbor (29.26 inches), the pressure was nearly a third of an inch below the normal, and at Dutch Harbor was the lowest for December in the record of the last 17 years. At Midway Island, on the contrary, the average of 30.17 inches, which was 0.13 inch above the normal, was next to the highest at that station since 1912. There was therefore an unusual barometric gradient between these two stations in middle longitudes, amounting to 0.91 inch. The greatest daily difference was on the 2d, with the Midway reading at 30.20 inches, and that of Dutch Harbor at 28.46 inches. The Aleutian cyclone was thus strongly developed, and with pressures below the normal for fully three-fourths of the month. The Pacific-California anticyclone was also well developed in central latitudes. with pressures slightly above the normal at all land stations within its boundaries.

Pressure data for several island and mainland coast stations in west longitudes are given in the following table:

TABLE 1.—*Averages, departures, and extremes of atmospheric pressure at sea level at indicated hours, North Pacific Ocean, December, 1928*

Stations	Average pressure	Departure from normal	Highest	Date	Lowest	Date
	Inches	*Inch*	*Inches*		*Inches*	
Dutch Harbor [1]	29.26	−0.32	30.14	17th	28.34	6th.
St. Paul [1]	29.32	−0.29	30.02	26th	28.64	3d.[4]
Kodiak [1]	29.29	−0.29	30.26	17th	28.38	22d.
Midway Island [1]	30.17	+0.13	30.44	24th	29.96	30th.[4]
Honolulu [2]	30.08	+0.07	30.25	26th	29.92	31st.
Juneau [2]	29.77	−0.02	30.64	17th	28.84	8th.
Tatoosh Island [2 3]	30.04	+0.07	30.66	17th	29.16	24th.
San Francisco [2 3]	30.17	+0.06	30.47	30th	29.65	2d.
San Diego [2 3]	30.10	+0.06	30.26	20th	29.88	11th.

[1] P. m. observations only.
[2] A. m. and p. m. observations.
[3] Corrected to 24-hour mean.
[4] And on other dates.

The wind movement over much of the ocean showed an extraordinary activity, as a result largely of the abnormally great differences in pressure north and south, but partly because of intense storms issuing from upper latitudes of Asia. Gales were not only of daily occurrence over the ocean as a whole, especially north of the thirty-fifth parallel, but the number of days with gales of force 10 and upward was the greatest of any winter month in recent years. Also, according to reports already at hand, whole storm to hurricane velocities were encountered by vessels on the upper and middle routes on at least 11 days. Gales of forces 11 and 12 occasioned by traveling storms in east longitudes occurred on the 1st, 10th, 11th, 25th, and 26th; those occasioned by the Aleutian cyclone were reported as of the 5th, 6th, 8th, 11th, 15th, 20th, and 23d. The 11th was the day of most widespread severe storminess in northern waters. In some 5-degree squares between the fortieth and fifty-second parallels, where observations were thickest, there was upward of 25 to 30 or more per cent of the days with gales. Between 158° and 170° W., and closely along the fiftieth parallel, whole storm to hurricane winds were reported on five days during the early half of the month. A glance at the adjoining tabular reports of Gales and Storms will give a fair indication of the unwonted roughness of the weather during the closing month of the year.

Although there are no reports at hand at this writing of the existence of a typhoon in December, there are evidences of a depression of some activity west of Guam during the middle days of the month. The British motorship *Silveray* experienced a westerly gale of force 9 in this neighborhood in the 18th. A moderate gale occurred west of Luzon on the 17th.

On the 4th and 5th strong gales occurred between the Hawaiian Islands and Midway, and from the 24th to the 27th abnormally heavy northeast trades blew south and east of Hawaii, acquiring a force of 8 to 9 on the 25th to 27th as low in latitude as the thirteenth parallel. The Pacific-California anticyclone, extending farthest south during these days, gave highest pressure readings of the month at Honolulu.

The prevailing direction of the wind at Honolulu continued from the east, whence it blew 67 per cent of the time. The maximum velocity was at the rate of 42 miles an hour, from the northeast, during a thunderstorm on the 25th.

Moderate to strong northers, sometimes rising to force 9, covered the Gulf of Tehauntepec and a considerable southward stretch of the sea, on the 8th and 9th, and from the 24th to the 28th. On the 27th a norther of force 8 was experienced off the Costa Rican coast.

Little fog occurred over the traveled routes, except in local areas over the southern part of the Gulf of Alaska, and off the Washington and California coasts. From longitude 140° W., 48° to 51° N., eastward to Puget Sound, fog was quite general from the 14th or 15th to the 20th. Ten to 15 per cent of days with fog occurred off the middle and southern California coast. The phenomenon was observed on the 11th in the Gulf of Tehauntepec, and on the 30th a day's run northeast of Honolulu.

The following note on a singular electrical phenomenon was furnished by the British steamer *Collegian*, Capt. J. Jackson, San Francisco to Balboa, observers, D. Fraser, second officer, and G. Dewar, third officer:

Dec. 1, 3.50 a. m., lat. 11° 50′ N., long. 88° 45′ W. Lighting in low clouds, altitude about 10° to NNE. After one flash a streak of bluish light shot towards the zenith from the clouds, leaving a trail across the sky like a meteor to the altitude of about 30°, when it died out. The sky was clear except for clouds low on the horizon.